

*Abstract.* It is standardly held that Aristotle denies that artifacts are substances. There is no consensus on why this is so, and proposals include taking artifacts to lack autonomy, to be merely accidental unities, and to be impermanent. In this paper, I argue that Aristotle holds that artifacts *are* substances. However, where natural substances are absolutely fundamental, artifacts are merely relatively fundamental—like any substance, an artifact can ground such nonsubstances as its qualities; but artifacts are themselves partly grounded in natural substances. Many contemporary metaphysicians view authorial intentions or communal recognition as an essential feature of most artifactual kinds. Drawing on Aristotle’s own examples of artifactual definitions, I note that there is little reason to ascribe this view to Aristotle. So Aristotle has the resources to hold that it is possible that there are kinds with both artifactual and non-artifactual members.

It is standardly held that Aristotle denies that artifacts are substances. There is no consensus on why this is so, and proposals include taking artifacts to lack autonomy, to be merely accidental unities, and to be impermanent. In this paper, I will argue that Aristotle holds that artifacts *are* substances. However, where natural substances are absolutely fundamental, artifacts are merely relatively fundamental—like any substance, an artifact can ground such nonsubstances as its qualities; but artifacts are themselves partly grounded in natural substances.

So that is one controversial move made in the essay. A second is this. Many contemporary metaphysicians view something like authorial intention or communal recognition as an essential feature of most artifactual kinds. But take a kind whose members are typically artifacts, such as *house*. I will argue that Aristotle would deny that features such as authorial intention or communal recognition are part of the definition of houses. So Aristotle has the resources to hold that it is possible that there are kinds with both artifactual and non-artifactual members.

Consider an artifact such as a house, a chair, an arrowhead or a sandcastle. Such artifacts exhibit many of the marks characteristic of substances. Primary substances are identified in *Categories* 5 as being incapable of standing in a predicative relation to a subject. Yet a term referring to an individual house, no less than a term referring to a natural substance such as a human or a horse, can stand in the subject position, but not the predicate position, of a standard Aristotelian subject-predicate sentence. Also, an individual substance lacks a contrary. Just as there is no contrary for an individual man, there is no contrary for an individual house. And neither an artifact nor a natural substance admits of variation of degree with respect to being a substance. As I will note below, Aristotle does allow for degrees of substantiality among different kinds of substances, but he denies that a substance of one kind admits of variation of degree within itself. For example,

**T1** one man cannot be more man than another, as that which is white may be more or less white than some other white object, or as that which is beautiful may be more or less beautiful than some other beautiful object. The same quality, moreover, is said to subsist in a thing in varying degrees at different times. A body, being white, is said to be whiter at one time than it was before, or, being warm, is said to be warmer or less warm than at some other time. But substance is not said to be more or less that which it is: a man is not more truly a man at one time than he was before, nor is anything, if it is substance, more or less what it is. (3<sup>b</sup>37-4<sup>a</sup>9)

οἷον εἰ ἔστιν αὕτη ἡ οὐσία ἄνθρωπος, οὐκ ἔσται μᾶλλον καὶ ἥττον ἄνθρωπος, οὔτε αὐτὸς αὐτοῦ οὔτε ἕτερος ἑτέρου. οὐ γάρ ἐστιν ἕτερος ἑτέρου μᾶλλον ἄνθρωπος, ὥσπερ τὸ λευκὸν ἐστιν ἕτερον ἑτέρου μᾶλλον λευκὸν, καὶ καλὸν ἕτερον ἑτέρου μᾶλλον· καὶ αὐτὸ δὲ αὐτοῦ μᾶλλον καὶ ἥττον λέγεται, οἷον τὸ σῶμα λευκὸν ὄν μᾶλλον λευκὸν λέγεται νῦν ἢ πρότερον, καὶ θερμὸν ὄν μᾶλλον θερμὸν καὶ ἥττον λέγεται· ἡ δέ γε οὐσία οὐδὲν λέγεται, —οὐδὲ γὰρ ἄνθρωπος μᾶλλον νῦν ἄνθρωπος ἢ πρότερον λέγεται, οὐδὲ τῶν ἄλλων οὐδέν, ὅσα ἐστὶν οὐσία· — ὥστε οὐκ ἂν ἐπιδέχοιτο ἡ οὐσία τὸ μᾶλλον καὶ ἥττον.

(Translations, with some alterations, are from Bostock (1994) except **T1** from Ackrill (1963), **T6** from Charlton (1970) and **T7** and **T8** from Ross (1908).) So too a house does not admit of variation of degree: one house may be a better house than another, but one house is not more of a house than another, or more of a house at one time rather than at another time.

An artifact, no less than a natural substance, seems to possess what Aristotle calls the most distinctive mark of substance: while remaining one and the same, it can admit contrary qualities. That is to say, a house admits of qualitative variation while remaining numerically identical. This seems to be true for both synchronic and diachronic qualitative variation. The fact that a house is smaller than a highrise but bigger than a breadbox does not make the artifact somehow two things. And an artifact such as a house appears to persist through qualitative changes.

In the *Metaphysics*, Aristotle arguably rejects features such as being a substratum persisting through changes as marks of substance in favor of such marks as being a ‘this’, exhibiting unity and being separate. But at first blush, artifacts would seem to possess these marks no less than natural substances. I can refer to an artifact by demonstration, just as I can demonstratively refer to a natural substance. The parts of an artifact are unified by reference to the definition and characteristic activity of the whole, just as in the case of the body parts of living things. And an individual artifact appears to possess a capacity for independent existence no less than an individual animal. Of course, much depends on the interpretation of these marks of substance, and a rival view of separation will be central to my argument below.

Despite these considerations, most Aristotle scholars have ascribed to Aristotle the view that artifacts are not substances. I will rehearse some of the reasons given for this view below. But first I will note that the textual evidence for this ascription is slight. Indeed, Aristotle nowhere unambiguously denies that artifacts are substances. He does canvass rejecting that artifacts are substances in the following passage.

**T2** On whether the substances of destructible things are separable nothing is yet clear, though it is clear that some cannot be. Substances such as a house or an implement cannot exist apart from the particular houses and implements. Perhaps (*isōs*) indeed these are not even substances, and nor is anything which is not formed by nature; one might well hold that the only substance to be found in destructible things is their nature. (1043<sup>b</sup>18-23)

εἰ δ' εἰσὶ τῶν φθαρτῶν αἰ οὐσίαι χωρισταί, οὐδέν πω δῆλον πλὴν ὅτι γ' ἐνίων οὐκ ἐνδέχεται δῆλον ὅσα μὴ οἷόν τε παρὰ τὰ τινὰ εἶναι οἷον οἰκίαν ἢ σκεῦος ἴσως μὲν οὖν οὐδ' οὐσίαι εἰσὶν οὐτ' αὐτὰ ταῦτα οὔτε τι τῶν ἄλλων ὅσα μὴ φύσει συνέστηκεν τὴν γὰρ φύσιν μόνην ἄν τις θεῖη τὴν ἐν τοῖς φθαρτοῖς οὐσίαν.

Since Aristotle qualifies the rejection with a 'perhaps' (*isōs*), **T2** is consistent with the view that artifacts are substances but not unqualifiedly substances, a view which Aristotle implies in the following passage.

**T3** Things which come to be do so either by nature or by skill or spontaneously; and they all come to be something, and come from something and are brought to be by something. (When I say that they come to be something, I mean the 'something' to apply in any category; they may come to be a this, or to be somehow quantified or qualified or placed.) Natural generation applies to those things whose generation is due to nature. What they come from is what we call matter; what they are brought into being by is something that exists naturally; and what they come to be is a man or a plant or something else of this sort, which we call substance most of all (*malista*). (1032<sup>a</sup>2-19)

τῶν δὲ γιγνομένων τὰ μὲν φύσει γίγνεται τὰ δὲ τέχνη τὰ δὲ ἀπὸ ταυτομάτου, πάντα δὲ τὰ γιγνόμενα ὑπὸ τέ τινος γίγνεται καὶ ἔκ τινος καὶ τί: τὸ δὲ τί λέγω καθ' ἐκάστην κατηγορίαν: ἢ γὰρ τόδε ἢ ποσὸν ἢ ποιὸν ἢ πού. αἱ δὲ γενέσεις αἱ μὲν φυσικαὶ αὐταὶ εἰσὶν ὧν ἡ γένεσις ἐκ φύσεώς ἐστιν, τὸ δ' ἐξ οὗ γίγνεται, ἢν λέγομεν ὕλην, τὸ δὲ ὑφ' οὗ τῶν φύσει τι ὄντων, τὸ δὲ τί ἄνθρωπος ἢ φυτὸν ἢ ἄλλο τι τῶν τοιούτων, ἃ δὴ μάλιστα λέγομεν οὐσίας εἶναι.

The most that can be drawn from **T3** is that artifacts are not called substances most of all. (Aristotle believed that many living things arise spontaneously through abiogenesis, and these too are not substances most of all.) The Greek adverb *malista* is the superlative of *mala*, very, and might suggest that there are at least two degrees of substantiality (or rather, two degrees of being called a substance) and so there are both things called substances and things called most of all substances. I have generally translated this phrase as ‘most of all’, altering the Bostock translations. Bostock translates the phrase variously; for example he translates the final clause in **T3** as ‘which we most strongly affirm to be substances’. An anonymous referee notes that the term also might be translated as ‘certainly’ or ‘clearly’, which would attenuate the support **T3** provides for some of the interpretative moves made in the paper. Going forward, I assume that *malista* is to be translated as ‘most of all’, and the interpretation I offer is somewhat hypothetical on the correctness of this translation decision. For convenience, I will occasionally label things called most of all substances as ‘most-of-all substances’.

Aristotle uses the term in a few other passages—for example, in **T4** and **T5**, below.

**T4** Of the several ways in which substance is spoken of, there are at any rate four which are the most important; the substance of a thing seems to be (a) what being is for that thing, and (b) its universal and (c) its genus, and fourthly (d) the substratum. The substratum is that of which the rest are predicated while it is not itself predicated of anything else. For this reason we must first determine its nature, for the primary substratum seems most of all (*malista*) to be substance. (1028<sup>b</sup>33-29<sup>a</sup>2)

Λέγεται δ' ἡ οὐσία, εἰ μὴ πλεοναχῶς, ἀλλ' ἐν τέτταρσί γε μάλιστα: καὶ γὰρ τὸ τί ἦν εἶναι καὶ τὸ καθόλου καὶ τὸ γένος οὐσία δοκεῖ εἶναι ἐκάστου, καὶ τέταρτον τούτων τὸ ὑποκείμενον. τὸ δ' ὑποκείμενόν ἐστι καθ' οὗ τὰ ἄλλα λέγεται, ἐκεῖνο δὲ αὐτὸ μηκέτι κατ' ἄλλον: διὸ πρῶτον περὶ τούτου διοριστέον: μάλιστα γὰρ δοκεῖ εἶναι οὐσία τὸ ὑποκείμενον πρῶτον.

In **T4**, Aristotle asks what, among such contenders as the substratum, the form or essence, the universal and the genus, has the best claim to substantiality; he writes that the substratum seems to be substance most of all—a claim he goes on to reject, partly on the grounds that the substratum is not separate.

**T5** If, then, we proceed on this basis [i.e. taking as a mark of a substance that it is a substratum], matter turns out to be a substance. But this is impossible, for separability and thisness seem to belong most of all (*malista*) to substance; and for this reason the form and the compound would seem to be substance more than matter is. (1029<sup>a</sup>26-30)

ἐκ μὲν οὖν τούτων θεωροῦσι συμβαίνει οὐσίαν εἶναι τὴν ὕλην: ἀδύνατον δέ: καὶ γὰρ τὸ χωριστὸν καὶ τὸ τόδε τι ὑπάρχειν δοκεῖ μάλιστα τῇ οὐσίᾳ, διὸ τὸ εἶδος καὶ τὸ ἐξ ἀμφοῖν οὐσία δόξειεν ἂν εἶναι μᾶλλον τῆς ὕλης.

How ought we to take this distinction between substances and substances most of all? Let's take **T5** as a point of departure. Admittedly, the application of **T5** is somewhat tenuous. Where in **T3** and **T4** *malista* modifies calling something a substance or something seeming to be a substance, in **T5** *malista* modifies the belonging of an alleged characteristic mark to substance. I will assume that the marks which belong most of all to substances are characteristic of most-of-all substances.

As we have seen, a characteristic mark of substances is that they are called 'separate'. Above, in **T2** for example, we followed a common translation decision in taking separation to involve a capacity for independent existence. Fine (1984) argues for such a reading. In Corkum (2008 and 2016), I argue that separation terminology often refers to a notion of grounding and cannot be reduced to capacities for independent existence. For discussion of the general methodology of appealing to the contemporary notion of grounding in ancient philosophy scholarship, see Corkum (forthcoming).

Grounding is a relation that backs explanations by relating derivative entities to more fundamental entities. If one fact grounds a second then the second obtains in virtue of the first fact obtaining. For example, we might hold that certain biological facts are grounded in—that is to say, obtain in virtue of—certain chemical facts. To say that aspects of biology are explained by reference to aspects of chemistry is not to say that chemical facts are not themselves grounded. For example, we might hold that chemical facts are grounded in physical facts, and so aspects of chemistry are explained by reference to physics. Chemical facts in this story are not absolutely fundamental but they play the role of fundamental relata in the explanation of certain biological facts. Call the chemical facts in this example *relatively* fundamental. My proposal is that the distinction between most-of-all substances and substances that are not most-of-all substances is the distinction between absolute and relative fundamental entities. That there would be degrees of substantiality in this way does not violate the prohibition in **T1**. An individual substance is not more or less what it is, from one time to another or in one respect. But an entity can play the role of ground with respect to a given contrast class of derivative items, while not being itself ungrounded.

An anonymous referee questions what notion of fundamentality is relevant. Although I do not develop an interpretation of fundamentality for Aristotle in this paper, I am assuming the commonly held contemporary view, that the absolutely fundamental is what is ungrounded. For discussion of the contemporary view, see for example Tahko (2018). The referee doubts that natural substances are fundamental in this sense. I do not understand why they have this doubt, but it may be helpful to note that I read Aristotle as holding that a natural substance may rely on others—as a plant is dependent on sunlight—while not being thereby grounded in others.

Let me draw out a few points of connection with other issues in Aristotle scholarship. The thesis that artifacts are relatively fundamental is similar to a move I made in Corkum (2012). There I argue that Aristotle views certain mathematical objects as properties of sensible substances; but he holds that mathematicians treat such objects as themselves substances within a domain restricted to mathematical objects and their properties.

Similarly, the proposal in this essay is that individual artifacts act as substances when considered in a domain restricted to artifacts, their kinds and their properties. Let me clear up a potential misunderstanding. It may seem to the reader that I take the characteristic mark of a substance to be that it is a substratum. A term referring to a substratum can stand in subject position in statement expressing a simple predication or a categorical proposition. And Aristotle rejects the role of being the substratum as a mark of substance in **T5**, since the mark overgenerates, wrongly counting matter as a substance. However, Aristotle does not reject impredicability as a mark of substance. He consistently holds that a term picking out a substance cannot stand in predicate position in a categorical statement. My proposal is that an item is a substance if it is impredicable within a given domain, and a most-of-all substance if it is impredicable within the unrestricted domain.

This general line of interpretation draws an attractive picture of the relation between the *Categories* (where, as we have seen, there is the best evidence for taking artifacts to be substances) and the *Metaphysics* (where, as we have also seen, there is reason to hesitate to ascribe this view to Aristotle). Allow me an aside on this point. In the *Categories*, Aristotle asserts that individual objects such as you and I are primary substances. But in the *Metaphysics*, Aristotle views such objects as hylomorphic compounds. He takes the forms of these individuals to be the substance of the thing, and there is a scholarly discussion whether this is an inconsistency or a change in Aristotle's metaphysical views. Within the restricted ontology of the *Categories*, individual objects are maximally fundamental. One might view the *Categories* as presenting a static ontology, a snapshot picture of the world, with its objects, qualities and so on, but without viewing these items as changing through time. But in the *Metaphysics*, the domain is expanded to include forms and materials as the causal explanations of the activities of the individuals of the *Categories*. In this expanded world, individual objects are not maximally fundamental. To put the point in another way, in the *Categories* individual objects are treated as if they are absolutely fundamental, but in the *Metaphysics*, they are treated as relatively fundamental. Relative fundamentality is of course a relation, and so the ascription of relative fundamentality is influenced by the appropriate contrast class. The differences between the *Categories* and the *Metaphysics* can thus be explained with ascribing neither inconsistency nor change in Aristotle's metaphysical views.

### 3

Why are artifacts not absolutely fundamental? One might hope that one of the extant explanations in the secondary literature as to why artifacts are not substances could be tweaked to provide an explanation. I will discuss three explanations. Consideration of these interpretations will also give me the opportunity to discuss some of the features Aristotle associates with artifacts.

Katayama (1999) holds that artifacts are not substances since their species are not eternal. Katayama appeals to passages such as **T2** to argue that the artifactual form is not separate from the composite, and so cannot exist apart from composites; since all composites can pass out of being, artifactual forms are also impermanent. This argument rests on the

mistaken view that separation terminology in Aristotle refers to a capacity for independent existence. Aristotle holds that both artifactual and natural sub-lunary *individuals* are impermanent. He does seem to believe that natural *species* are eternal. There has always been and always will be humans. But if Aristotle does hold this view, he could also believe that certain kinds of artifacts are also eternal. The production of artifacts involves deliberation but artifactual kinds are not necessarily *inventions*. And Aristotle might well hold that man has always made tools and always will make tools. He seems to endorse something like part of this line at 7.15 (1039<sup>b</sup>25), writing that “being for a house cannot come to be; only being for this particular house.” Finally, even if impermanence *distinguished* artifacts from natural substances, artificiality does not *consist* in impermanence.

A second line of explanation. Some scholars hold that artifacts lack autonomy. For example, Gill (1991, 213) writes that “artifacts are not self-preserving systems but depend on external agents both for the full realization of their being and for their maintenance. Artifacts lack autonomy, and for this reason they are ontologically dependent on other more basic entities.” Irwin (1988, 571-72 n. 8) offers a somewhat similar interpretation, although he ascribes to Aristotle merely a doubt that artifacts are substances, on the basis of their lack of autonomy. Adapting this thought to our purposes, we might say that a house, for example, is not absolutely fundamental since it depends on the artisan for its production, and other craftsmen for its upkeep.

There are reasons to doubt whether such an account provides a fully satisfying explanation why Aristotle characterizes artifacts as substances but not most-of-all substances. To bring out this point consider in more detail the alleged disanalogies in causal explanations between artificial and natural generation. Gill and others hold that artifactual production and natural generation differ with respect to the efficient cause. On this line, Aristotle holds that the efficient cause for production involves reference to something different in essence from the artifact—namely, the artisan. But Aristotle at least occasionally implies that the efficient cause in artifactual production is instead the form of the artifact. It is uncontroversial that the process of production at least partly involves the form, as entertained by the artisan, and that this manner by which the form is initially exemplified plays a role in classifying the artifact as such. For example, Aristotle says at *Metaphysics* 7.7 (1032<sup>b</sup>1) that “the things produced by skill are those whose form is in the soul of the producer.” The role of the artisan, whose rational soul immaterially actualizes the form and whose activity makes that form manifest in a material, may be just as an enabling condition. The artisan allows the form to be efficacious, just as in the case of a natural generation such as the growth of an acorn, the presence of sufficient sunlight and water is an enabling condition allowing the form—here, materially manifest in the parent oak—to be efficacious.

But putting this doubt aside, Aristotle’s discussion of natural objects and artifacts in *Physics* 2.1 certainly suggests that he would draw this contrast in terms of something akin to autonomy.

T6

This [contrast between natural objects and artifacts] suggests that nature is a sort of source and cause of change and remaining unchanged in that to which it belongs primarily and of itself, that is, not by virtue of a concomitant attribute. (What do I mean by that qualification? Well, a man who is a doctor might come to be a cause of health in himself. Still, in so far as he is healed he does not possess the art of medicine, but being a doctor and being healed merely concur in the same person. Were the matter otherwise, the roles would not be separable.) Similarly with other things which are made. They none of them have in themselves the source of their making, but in some cases, such as that of a house or anything else made by human hands, the source is in something else and external, whilst in others the source is in the thing, but not in the thing of itself, i.e. when the thing comes to be a cause to itself by a concomitant attribute. (192<sup>b</sup>20-32)

ὡς οὐσης τῆς φύσεως ἀρχῆς τινὸς καὶ αἰτίας τοῦ κινεῖσθαι καὶ ἡρεμεῖν ἐν ᾧ ὑπάρχει πρῶτως καθ' αὐτὸ καὶ μὴ κατὰ συμβεβηκός (λέγω δὲ τὸ μὴ κατὰ συμβεβηκός, ὅτι γένοιτ' ἂν αὐτὸς αὐτῷ τις αἴτιος ὑγείας ὡς ἰατρός· ἀλλ' ὅμως οὐ καθὼ ὑγιαίνεται τὴν ἰατρικὴν ἔχει, ἀλλὰ συμβέβηκεν τὸν αὐτὸν ἰατρὸν εἶναι καὶ ὑγιαζόμενον· διὸ καὶ χωρίζεται ποτ' ἀπ' ἀλλήλων). ὁμοίως δὲ καὶ τῶν ἄλλων ἕκαστον τῶν ποιουμένων· οὐδὲν γὰρ αὐτῶν ἔχει τὴν ἀρχὴν ἐν ἑαυτῷ τῆς ποιήσεως, ἀλλὰ τὰ μὲν ἐν ἄλλοις καὶ ἔξωθεν, οἷον οἰκία καὶ τῶν ἄλλων τῶν χειροκμητῶν ἕκαστον, τὰ δ' ἐν αὐτοῖς μὲν ἀλλ' οὐ καθ' αὐτά, ὅσα κατὰ συμβεβηκὸς αἴτια γένοιτ' ἂν αὐτοῖς.

Natural things have an internal and *per se* source of their activity. States such as health can be achieved through an internal source which is not *per se*; and artifacts lack internal causes of their own production. However, the inference that Gill seems to draw—artifacts are ontologically dependent on things other than themselves, and so not full-fledged substances—rests (not unlike Katayama's argument) on the mistaken assumption that the relevant notion of dependence here is a capacity for existence. Artifacts cannot exist without artisans. But so too I could not exist without my parents. And Gill holds that artifacts cannot persist without external agents providing occasional maintenance, but neither can the unhealthy persist without occasional medical attention. (Thanks to an anonymous referee for pressing me on this point.) And generally, one thing's incapacity to exist without some second thing fails to show that the first is not a substance. Aristotle seems to view the contrast between natural things and artifacts in terms akin to autonomy. But even if an object is an *artifact*, as opposed to a natural thing, because it is non-autonomous, it is far from clear that this is why artifacts are not full-fledged *substances*.

A third line of explanation. Some scholars hold that artifacts lack the integrity of natural substances. Kosman (1987, 369), for example, holds that artifacts are not substances since artifacts are accidental unities, like kooky objects (e.g. white horse). Compare Halper (1989, 171-72), Gerson (1984) and Ferejohn (1994). Aristotle views unity as a mark of substances, and so this line of interpretation holds promise for explaining why

artifacts are not full-fledged substances. The integrity exhibited by artifacts is in some way impoverished, in comparison to natural substances. For reasons that will become clearer in the final section of the paper, I find some considerations that might support the interpretation less than compelling. But generally, I agree with the views that individual artifacts are non-autonomous, impermanent and perhaps merely accidental unities, but I doubt that these features fully explain why artifacts are not most-of-all substances. Rather, these features strike me as *explananda* which, as a condition of adequacy, accounts of artificiality and substantiality ought to be able to explain. So it will be helpful to first lay out my proposal, and then return to these interpretations.

4

Here is an alternative reason why Aristotle holds that artifacts are merely relatively fundamental. Aristotle asserts in the following passage that it is the artifactual form which is not separate.

**T7** Again, is there anything besides the concrete whole (I mean the matter and the form in combination) or not? If not, all things in the nature of matter are perishable; but if there is something, it must be the form or shape. It is hard to determine in what cases this is possible and in what it is not; for in some cases, e.g. that of a house, the form clearly does not exist in separation. (1060<sup>b</sup>23-28)

ἔτι πότερον ἔστι τι παρὰ τὸ σύνολον ἢ οὐ λέγω δὲ τὴν ὕλην καὶ τὸ μετὰ ταύτης; εἰ μὲν γὰρ μή, τά γε ἐν ὕλῃ φθαρτὰ πάντα: εἰ δ' ἔστι τι, τὸ εἶδος ἂν εἴη καὶ ἡ μορφή: τοῦτ' οὖν ἐπὶ τίνων ἔστι καὶ ἐπὶ τίνων οὐ, χαλεπὸν ἀφορίσαι: ἐπ' ἐνίων γὰρ δῆλον οὐκ ὄν χωριστὸν τὸ εἶδος, οἷον οἰκίας.

**T7** is compatible with my claim that an artifact is relatively fundamental, or fundamental within the restricted ontology of the *Categories*. For Aristotle is considering in **T7** what is separate within an expansive ontology, a domain which includes form and matter. In this context, 'separate' plausibly means absolutely fundamental. **T7** might suggest that the reason an artifact is not absolutely fundamental is a deficiency primarily with its form, and not its reliance on external agents for generation and maintenance.

From what are artifactual forms inseparable? That is to say, on what are artifactual forms grounded? Here's a conjecture: **T7** suggests that artifactual forms are inseparable from the hylomorphic compound. And Aristotle's own examples of artifactual definitions would seem to support this suggestion. For example, he writes that

**T8** if we had to define a threshold we should say a 'wood or stone arranged so-and-so (*hōdi keimenon*) and a house, 'bricks and timbers arranged so-and-so (*hōdi keimena*)' or there is a final cause (*to heneka*) as well in some cases.... And so, of the people who go in for defining, those who define a house as stones, bricks, and timbers are speaking of the potential house, for these are the matter; but those who propose 'a receptacle to shelter

goods and bodies', or something of the sort, speak of the actuality.  
(1043<sup>a</sup>5-18)

οἷον εἰ οὐδὸν δέοι ὀρίσασθαι, ξύλον ἢ λίθον ὡδὶ κείμενον ἐροῦμεν, καὶ οἰκίαν πλίνθους καὶ ξύλα ὡδὶ κείμενα ἢ ἔτι καὶ τὸ οὐ ἔνεκα ἐπ' ἐνίων ἔστιν ... οἱ μὲν λέγοντες τί ἐστὶν οἰκία, ὅτι λίθοι πλίνθοι ξύλα, τὴν δυνάμει οἰκίαν λέγουσιν, ὕλη γὰρ ταῦτα· οἱ δὲ ἀγγεῖον σκεπαστικὸν χρημάτων καὶ σωμάτων ἢ τι ἄλλο τοιοῦτον προτιθέντες, τὴν ἐνέργειαν λέγουσιν.

The context of this passage is a discussion of defining things that are analogous to substances—again, I take 'substances' here to refer to most-of-all substances. In the immediately preceding chapter, *Metaphysics* 8.2, Aristotle notes that there are a variety of kinds of definition for such things, including appealing to the ways materials are combined, to position, place and sensible attributes. In **T8**, Aristotle canvasses defining a house by appeal to its material arrangement, and its final cause. The first kind of definition makes reference to the material of the compound, and so the form of an artifact is partly grounded in its natural matter. Aristotle also canvasses the suggestion that artifactual forms are partly grounded in its final cause. The end of a house, for example, might be a certain way of providing shelter. Of course, the shelter that a house provides is specific to the needs of those to be housed within the structure. On this suggestion, then, what it is to be human partly grounds what it is to be a house. Likewise, a chair might be defined in terms of a assemblance of natural materials—with reference to an arrangement of its legs, seat and back. Or a chair might be defined as being for sitting—with reference to a posture specific to the way human legs can be articulated.

Aristotle's examples generally are at best defeasible indicators of his views; but they do provide *prima facie* evidence. The examples in **T8** suggest that Aristotle would disagree with many contemporary metaphysicians. Let me here lay out an overly simple contemporary theory. No one to my knowledge advocates such a view, but the sketch will throw into sharp relief my reading of Aristotle's view. In the final section of the essay, I will briefly sample a few contemporary authors, so to present a more sophisticated theory, and to draw a more nuanced contrast with Aristotle. Artifacts are typically produced with the authorial intention to produce a thing with the function associated with members of that kind. The artisan usually makes a chair with the intention of creating an object suited for sitting. But one might go further and view a chair as being *essentially* so produced. On this line, authorial intentions are a constituent of the definition of a given artifact. For example, a definition of a chair might be given as an object made with the intention of being suited for sitting. A found object or readymade artwork need not be originally produced with authorial intentions for its function; and the intentions of an artist or community, in recognizing the object as having such a function, may serve a similar definitional role.

However, Aristotle's examples of artifactual definitions in **T8** suggest that he would hesitate to locate authorial intentions or communal recognition within an artifact's form, essence or definition. Let me begin to bring this section of the essay to a close with a vivid case. Suppose that while carrying some lumber and nails, I fall down the stairs and,

in my tumbling, assemble what looks like a chair. Contemporary theorists would perhaps doubt that the result of the accident is indeed a chair. I agree that the result is not an *artifact*, but it is less obvious to me—both as a philosophical claim and as a point of Aristotle interpretation—that the result is not a *chair*.

To sum up the story so far, I have argued that artifacts are substances, since they are relatively fundamental, but they are not called substances most of all, since they are not absolutely fundamental. Artifacts are not absolutely fundamental because artifactual forms are grounded in natural forms. On this line of interpretation, the status of the object as a *substance*, and the characterization of its definition or essence, are distinct issues from the status of the object as an *artifact*, and the process of its production.

I will return to the rival accounts of artificiality. Recall, scholars have suggested that artifacts are not substances because they lack autonomy, are merely accidental unities, or are impermanent. And we considered above whether any of these accounts can explain why Aristotle appears to view artifacts as substances but not most-of-all substances. (I will discuss the view that artifacts are accidental unities in more detail in the next section.) Although I doubt that the status of not being a most-of-all substance *consists* in lacking autonomy, being an accidental unity or being impermanent, I do not deny that individual artifacts typically exhibit these features. And perhaps the account I have put forward can go some ways towards explaining this. Kinds of objects that are typically artifacts are by definition arrangements, externally imposed on natural materials, for human use. For this reason, members of such kinds are typically produced and maintained by the deliberative action of an artisan. The arrangements are extrinsic to the natures of the components, and so the resultant unity is merely accidental. And since the parts are not held together necessarily, such arrangements are likely to be impermanent. These features flow from what it is to be a kind, the members of which are typically artifacts. They are commonly exhibited by individual artifacts. But they are neither necessary nor essential to be a member of such a kind.

## 5

Let me address a few objections. Consideration of these complaints will help to flesh out the proposal. First, in the line of interpretation put forward in my (2012) and in this essay, something is a substance if it is impredicable within some domain or other, and a most-of-all substance if it is impredicable in the unrestricted domain. On this view, anything can be called a substance, given a sufficiently restricted domain. In response, yes, I embrace this consequence. But such narrow domains are of little interest, and it should be clear that the metaphysician will be interested in domains of mathematical objects in abstraction from non-mathematical objects, or in domains of artifacts considered apart from natural substances, and in articulating what grounds what within these realms.

A second objection. I have claimed that artifacts are substances, but here's a reason why that claim is wrong. No substance has substances as actual parts, yet artifactual components are themselves substances, temporally prior to the composite. So an artifactual composite cannot be a substance. This is also why we ought to take artifactual

matter to be best described as actualities, and not potentialities for the artifactual form, unlike in the case of natural substances. This line of thinking might be put forward in defense of Kosman's position. Artifacts are merely accidental unities, for they have been assembled into a single thing by imposing on pre-existing substances a structure extrinsic to them. Thus a chair, for example, is constructed out of legs, seat and back. Each of these is an actual substance, existing as such prior to the construction of the chair, and not a mere potential constituent of a chair.

One passage where Aristotle might be taken to be endorsing the thesis that no substance has actual substantial parts is the following

**T9** It is impossible for a substance to be composed of substances present in it in actuality. For what is in actuality two things cannot also be in actuality one thing, though a thing may be one and at the same time potentially two. (For instance, a line that is double another line is composed of two halves, but only potentially; for the actuality of the two halves separates them from each other.) (1039<sup>a</sup>3-7)

ἀδύνατον γὰρ οὐσίαν ἐξ οὐσιῶν εἶναι ἐνυπαρχουσῶν ὡς ἐντελεχεία: τὰ γὰρ δύο οὕτως ἐντελεχεία οὐδέποτε ἐν ἐντελεχεία, ἀλλ' ἐὰν δυνάμει δύο ἦ, ἔσται ἓν (οἷον ἡ διπλασία ἐκ δύο ἡμίσεων δυνάμει γε: ἡ γὰρ ἐντελέχεια χωρίζει)

One difficulty with this line of objection is that it is not clear that Aristotle endorses the thesis. The immediate context of **T9** is this: Aristotle argues that no universal is a substance. He moots the thesis that no substance has actual substantial parts in **T9**. And then he immediately problematizes the thesis by noting that it appears to be inconsistent with the claim that no universal is a substance.

**T10** This result, however, involves a problem. For if no substance can be composed of universals (since a universal signifies such a kind of thing, and not a this), and if also no substance can be composed of substances present in it in actuality, then every substance must be incomposite and so indefinable. Yet everyone things—and we have long ago asserted—that it is only or chiefly substances that can be defined. (1039<sup>a</sup>14-20)

ἔχει δὲ τὸ συμβαῖνον ἀπορίαν. εἰ γὰρ μήτε ἐκ τῶν καθόλου οἷόν τ' εἶναι μηδεμίαν οὐσίαν διὰ τὸ τοιόνδε ἀλλὰ μὴ τόδε τι σημαίνειν, μήτ' ἐξ οὐσιῶν ἐνδέχεται ἐντελεχεία εἶναι μηδεμίαν οὐσίαν σύνθετον, ἀσύνθετον ἂν εἶη οὐσία πᾶσα, ὥστ' οὐδὲ λόγος ἂν εἶη οὐδεμιᾶς οὐσίας. ἀλλὰ μὴν δοκεῖ γε πᾶσι καὶ ἐλέχθη πάλοι ἢ μόνον οὐσίας εἶναι ὄρον ἢ μάλιστα.

(Notice that *malista* is used here to contrast substances with other things that might, less strictly speaking, be definable. The use of the expression here is different from its use in **T3**, **T4** and **T5**, where *malista* distinguishes different kinds of substances or identifies marks of substance. For this reason, I have stuck with the Bostock translation of the

expression as ‘chiefly’.) Aristotle seems to believe that the two theses taken together entail the substances are incomposite and indefinable. The argument of **T10** is obscure and has generated much discussion; see for example Bostock (1994, 202-4). Here’s one reconstruction. Aristotle is concerned with the question whether a species is a substance. A species is identified with a definition composed of a genus with a differentiae. A genus is either a universal or a substance. But if the genus is a substance, then the species has a substantial part. And if the genus is a universal, then the species is a universal, since it is composed of universals. On neither horn is a species a substance. And on the assumption that only species are definable, the theses that substances lack substantial parts and no universal is a substance is in conflict with a characteristic mark of substantiality, definability.

I’m inclined to think that Aristotle indeed endorses the view that no substance has substantial parts. He resolves the tension alluded to in **T10** by viewing substances as definable in only a qualified way. The substance of a thing, its individual form, is strictly indefinable but corresponds to a definable species. I cannot defend this line of interpretation here. For one thing, the identification of substance and individual form is controversial. But it suffices for my present purposes to note that the objection relies on a thesis that is not obviously Aristotle’s.

However, even if one ascribes the thesis that no substance has actual substantial parts to Aristotle, the objection may nonetheless falter. For the objection has it that artifacts are not substances because they have actual substances as parts. But it is not obvious that artifactual parts are themselves substances. The legs, seat and back of a wooden chair, for example, are initially hunks of matter belonging to a tree. They are given shape properties in the initial stages of the construction of the chair. And they are not mere potentialities. But to note that they exist prior to the final assembly of the chair is not to say that these parts are themselves substances.

And finally, even if one both holds that artifactual parts are actual substances, and ascribes to Aristotle the thesis that no substance has actual substantial parts, the objection may still falter. For the objection requires that we view the artifactual hylomorphic compound as the purported substance. If this individual chair is the purported substance, for example, then its parts, the legs, seat, back and so on, cannot be actual substances. But these parts are indeed actual substances, and so (the objection continues) the artifact cannot be a substance after all. However, Aristotle may concede that the chair is not a substance. I mentioned above that Aristotle may identify substances and individual forms. If that is right, then he may hold that it is the individual form of the chair, and not the chair itself, which is the purported substance. And more generally, Aristotle may believe that a substance is a form and not the hylomorphic compound which has the form as a constituent. Again, this identification of substance and individual form would be controversial, and I do not aim to defend the move here. The question of artifactual substances intersects with a range of interpretative difficulties, and the view that Aristotle denies that artifacts are substances since they contain substantial parts relies on a number of assumptions that can be resisted.

A third objection. I have claimed that the accidentally produced chair is a chair but not an artifact. But consider the following passage.

**T11** The question might be raised why some things are generated both artificially and spontaneously—e.g. health—and others not; e.g. a house. The reason is that in some cases the matter—which is the starting-point of the process in the production and generation of artificial things, and in which some part of the result is already existent—is such that it can initiate its own motion, and in other cases it is not. (1034<sup>a</sup>9-14)

ἀπορήσειε δ' ἂν τις διὰ τί τὰ μὲν γίγνεται καὶ τέχνη καὶ ἀπὸ ταυτομάτου, οἷον ὑγίεια, τὰ δ' οὐ, οἷον οἰκία. αἴτιον δὲ ὅτι τῶν μὲν ἡ ὕλη ἢ ἄρχουσα τῆς γενέσεως ἐν τῷ ποιεῖν καὶ γίγνεσθαι τι τῶν ἀπὸ τέχνης, ἐν ᾗ ὑπάρχει τι μέρος τοῦ πράγματος, ἢ μὲν τοιαύτη ἐστὶν οἷα κινεῖσθαι ὑφ' αὐτῆς ἢ δ' οὐ.

The context of this passage is a sequence of chapters, *Metaphysics* 7.7-7.9, where Aristotle compares natural and artifactual generation. He notes that both kinds of change have a formal cause, for example the male gamete in sexual reproduction, and the form of the artifact as entertained in the mind of the artisan in production. What then explains the difference among cases of artificial generation that some can also arise through spontaneity? The explanation is that in such cases the material cause can initiate the motion that gives rise to the resultant state or product. Notice however that **T11** does not obviously yield a counterexample to the accidental chair. Spontaneous events are one kind of happenstance, which Aristotle considers in *Physics* 2.4-2.6 as a potential rival fifth cause rival to the four causes. Aristotle's move is to view happenstance as an event which, under the right description, is adequately explained by just the four causes. For example, meeting a debtor at a market is a chance event but it just is the event of going to market to buy groceries; going to market to buy groceries is adequately explained by the formal, final, material and efficient causes; and it is only under the description of meeting a debtor that the event appears chancy. Notice that going to the market to buy groceries is an action involving deliberation. Occasionally, Aristotle uses the terminology of spontaneity to refer to the broader notion of happenstance where the underlying event is either deliberative or not; but he sometimes uses the terminology more narrowly to those cases of happenstance where the underlying event does not involve deliberation. The action which gives rise to the accidental chair is a deliberative act. The parts of the chair have been given their final shape, and I go down the stairs with the intention of assembling the chair. My deliberative action of going down the stairs can be described as a making of the chair, and it is only under that description that the event appears to be chancy. Notice that the accidental chair does not require the material to initiate its motion in the assembly: some of the action is brought about by the downwards tendency of the earth in my flesh and the wood; but the activity is initiated by my deliberation.

The reader may find the previous paragraph a cop-out, and I'm sympathetic. For one thing, Aristotle notes at 7.7 (1032<sup>a</sup>29) that some productions are by spontaneity and chance, and we might view the denial in **T11** of houses rising spontaneously as

enthymematic for a denial of houses rising either by chance or spontaneously. But moreover, with a little imagination, we could come up with a spontaneously generated chair, by telling a story similar to the story of the accidental chair. The lightning strikes the tree; the force of the strike shapes the branches into legs, seat and back; they fall into place as the assemblage falls to the ground; and the result is an object resembling a chair. If I am right about what I say about the accidental chair then I ought to say the same thing about the spontaneous chair: it is a chair but not an artifact. And **T11** seems to preclude this possibility.

To my mind, there is a significant difference in likelihood between the two chairs. And if you hold, as Aristotle appears to, that every legitimate possibility is at some time realized, the alleged possibility of either chair may seem academic. At any rate, little hinges on whether Aristotle, for some reason or other, would be reluctant to accept the possibility of either the accidental or the spontaneous chair. The accidental chair is meant to be a provocative case. My aim in raising the case is to bring out that we have not seen good textual evidence for holding that, for kinds generally artifactually produced, the intentional or deliberative activity of the artisan is built into the definition of that kind. Without such evidence, accidental and spontaneous chairs are, by our lights, possible. But Aristotle might disagree—not because he does believe after all that an artifact essentially depends on authorial intentions, but because of his views on matter or modality.

These next objections I owe to Simon Evnine. As Evnine brings to my attention, some contemporary authors allow that there are kinds with both artifactual and non-artifactual members. Consider the example of a village, which may be planned but which may arise simply because a number of houses happen to have been built in close enough proximity to each other, without the intention of founding a village. Hilpinen (2011) gives other examples: “Artifact sortals can be essentially or nonessentially (accidentally) artifactual. For example, ‘motor controller’ and ‘paper clip’ are essentially artifactual terms, but a path through a forest can be intentionally made (an artificial path) or it can be an unintended product of people's habit of following the same route when they walk through the forest.” Evnine tells me that he agrees with Hilpinen that some kinds only have artifactual members. Hilpinen gives the example of a paper clip, and Evnine suggests a melody. One might, on analogy with my accidental chair, randomly string together a sequence of notes—say, by leaning against a piano—without the intention of creating a melody. Evnine holds that this sequence of notes is not a melody and, furthermore, kinds such as *chair* and *house* are more like melodies or paper clips than villages or paths.

In support of this judgment, consider again **T8**. Recall, the passage begins: “a house we should define as ‘bricks and timbers arranged so-and-so (*hōdi keimena*)’ or a final cause may exist as well in some cases.” Aristotle canvasses two kinds of definitions for artifacts, one material-based and the other based on the final cause. In the material-based definition of a house, the timber and bricks are arranged ‘so-and-so’. Evnine points out to me that I must view this phrase as referring only to the static or final arrangement of the parts, their intrinsic properties and the relations obtaining among them. I cannot view the phrase as referring to the dynamic process of arranging these parts, or the history of the arrangement, which very well might include the intentions of the artisan.

Moreover, in **T8** Aristotle moots not only material-based but also final cause-based definitions. Such a definition of a house might run along the lines of ‘a receptacle to shelter goods and bodies’. A house is *for* shelter. These kinds of final causes appear to be purposes, and one might be hard pressed to explain how such purposes get attached to artifacts without a story involving intentions. On the simple contemporary theory of artifacts laid out in the previous section, artifacts are defined by reference to authorial intentions or communal recognition: the intentions of an artist in making the object for a purpose, or of a community in recognizing the object as having such a function, are a requirement for the object to be a member of a given artifactual kind. This theory is a tad too strong, as Evgine (2016, 121) explains:

Paul Bloom (1996, 5–6) argues, correctly I believe, that it is not necessary for something to belong to an artifactual kind that it be intended to perform the function associated with that kind. The function associated with the kind *chair*, for example, is to be sat on. Being sat on is what chairs are for. But one might make a chair to serve as an exhibition model, intending that no one sit on it (and hence lacking the intention that it be sat on).... This shows that having the associated function is not itself dependent on something’s being made with the intention that it perform that function.

What is the salient kind of intention? Bloom (1996, 10) holds that a member of an artifactual kind K must be intended to be of the same kind as current and previous members of the kind. Thompson (2007, 59) notes that “the relevant sort of intention to make a thing of artifactual kind K must thus involve a substantive (and substantively correct) concept of what a K is, including an understanding of what sorts of properties are K-relevant and an intention to realize many of them in the object created.” And Evgine (2016, 122) suggests the following.

Let K be some artifact kind associated with a given function F (as *chair* is associated with being sat on, *bottle opener* with opening bottles, and so on). An artifact has the function F if it is made, not with the intention that it be used to F (as the rejected account above had it), but with the intention that it be a K.

Putting the suggestion into somewhat more Aristotelian terms, an individual artifact need not be produced with an intended final cause, but it is sufficient for an artifact to have a given final cause that it be made with the intention to make something of a kind associated with that final cause. So, the objection concludes: by dint of both examples of artifactual definitions in **T8**, the material-based and final cause-based definitions, Aristotle is committed to viewing intentions as essential to artifacts.

I will end this essay by responding to these objections. In sketching a proposal for how artifacts might be dependent on natural substances, I have followed a method something along these lines: impose as little as possible, if the result is an not wholly implausible view. If there were independent reasons to think either on textual grounds that Aristotle believes authorial intentions are definitional for artifacts, or on philosophical grounds that

anyone must hold such a view, then one would read, for example, the purported definition of a house in **T8**, ‘wood and bricks arranged so-and-so’, sufficiently robustly that the specification of the arrangement includes the intentions of the arranger. But without either kind of reason, I believe that the thinner reading is the default one.

And indeed the textual evidence is too weak to support the ascription to Aristotle of the view that authorial intentions are definitional. Consider first the material-based definition in **T8**. The expression *hōdi keimena* contains the neutral plural present middle participle of *keimai*, used for the passive of *tithēmi*, and so means something like ‘the things being placed’ (see Smyth 1984, §1752, p. 397). The expression also contains the dative of manner for the deitic *hodos*, used emphatically with the *i* ending (Smyth 1984, §1240, p. 307), and so means something like ‘in this here way’. I have followed the Ross translation of the phrase as ‘so-and-so’ so as to not bias the translation too strongly. But to my ears, this expression does sound as a reference to just the static arrangement of the parts. Bostock (1994, 34), for example, seems to agree: he translates the phrase as ‘in such a position’. The use of the present participle *might* suggest the process of assemblance. But even if the expression is intended to refer to the history or process of the arranging, there is no reason to read authorial intentions into material-based definitions.

Other scholars might offer compelling textual reasons to think either that Aristotle does believe authorial intentions are definitional for artifacts. Or they may give good philosophical reasons for thinking that such a view is true. But I myself do not find compelling textual reasons to ascribe the view to Aristotle. And I do not think that the view is obviously false. To me it seems not implausible that the accidental chair is a chair but not an artifact. And similarly, since a melody is just an arrangement of notes, the accidental arrangement of notes is a melody but not an artwork, since that arrangement was not the result of intentional or deliberative artistic expression. If you prefer to call only an artifactual chair a ‘chair’ or an artistic melody a ‘melody’ then we may be having just a terminological dispute.

Now consider the final cause-based definition in **T8**. Recall that the objection runs that the final causes of an artifact are bestowed by intentional activity of an artisan. Notice first, however, that Aristotle hedges when introducing the final-based definition. He merely claims that artifacts in some cases have such definitions. It suffices for some of my present purposes that there are items falling under typically artifactual kinds which are lacking final-based definitions. And similarly, if there are kinds with both artifactual and non-artifactual members, then Aristotle may well hold that there are kinds, whose typical members are artifacts, where the process of production, the intentions of the author, or communal recognition is not definitional.

However, we have seen no reason to hold that for Aristotle the final causes of any artifact are bestowed by intentional activity of an artisan. Aristotle could easily agree with Evnine that an object has the function of a chair—that it is for sitting—if it is produced with the intention of being a chair, even if it is not made for sitting. We perhaps need to add a rider that the production be in some sense successful. But I see little evidence in

Aristotle that suggests that it is *necessary* that an object be produced with this intention for it to be a chair. Although this is another controversial claim that I cannot defend here, I believe that final causation is largely a statistical notion: final causes are end states, products or activities which are achieved for the most part. To say that a chair is for sitting is say how things of that kind are typically used. The *telos* of an act of chair-making may be to produce a product suited for sitting, regardless of the intentions of the artisan, just as the *telos* of an acorn's growth is the maturation and subsequent activities characteristic of an oak. A typical chair is made with the intention of this use, but a final-cause based definition applies no less to chairs resulting from happenstance.

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## Works Cited

- Ackrill, J. L. 1963 *Aristotle's Categories and De Interpretatione. Translated with Notes and a Glossary*. Oxford: Clarendon Press.
- Bloom, P. 1996 'Intention, History, and Artifact Concepts.' *Cognition* 60: 1-29.
- Bostock, D. 1994 *Aristotle Metaphysics Books Z and H. Translated with a Commentary*. Oxford: Clarendon Press.
- Charlton, W. D. 1984 *Aristotle Physics Books I and II*. Oxford: Clarendon Press.
- Corkum, P. 2008 "Aristotle on Ontological Dependence." *Phronesis* 53: 65-92.
- Corkum, P. 2012 "Aristotle on Mathematical Truth." *British Journal for the History of Philosophy* 20: 1057-76.
- Corkum, P. 2016 "Ontological Dependence and Grounding in Aristotle." *Oxford Handbooks Online in Philosophy* (2016) DOI: 10.1093/oxfordhb/9780199935314.013.31.
- Corkum, P. *forthcoming*. "Ancient" in *Routledge Handbook of Metaphysical Grounding*, ed. Michael Raven.
- Evnine, S. 2016 *Making Objects and Events: A Hylomorphic Theory of Artifacts, Actions and Organisms*. Oxford: Oxford University Press.

- Ferejohn, M. 1994 'The definition of generated composites in Aristotle's *Metaphysics*' in T. Scaltsas, D. Charles and M. L. Gill edd. *Unity, Identity and Explanation in Aristotle's Metaphysics*. Ithaca: Cornell University Press.
- Fine, G. 1984 'Separation.' *Oxford Studies in Ancient Philosophy* 2:31-87.
- Gerson, L. 1984 'Artifacts, substances and essences.' *Apeiron* 18: 50-57.
- Gill, M. L. 1991 'Aristotle on self-motion' in M. L. Gill and J. Lennox edd. *Self-Motion: From Aristotle to Newton*. Princeton: Princeton University Press.
- Halper, E. 1989 *One and Many in Aristotle's Metaphysics*. Columbus: Ohio State University Press.
- Hilpinen, R. 2011 'Artifact.' *The Stanford Encyclopedia of Philosophy* (Winter 2011 Edition), E. N. Zalta (ed.), URL = [<https://plato.stanford.edu/archives/win2011/entries/artifact/>](https://plato.stanford.edu/archives/win2011/entries/artifact/).
- Irwin, T. 1988 *Aristotle's First Principles*. Oxford: Clarendon Press.
- Katayama, E. 1999 *Aristotle on Artifacts*. State University of New York Press.
- Kosman, A. 1987 'Animals and other beings in Aristotle' in Gotthelf and Lennox. edd. *Philosophical Issues in Aristotle's Biology*. Cambridge: CUP.
- Ross, W. D. 1924 *Aristotle's Metaphysics*. Oxford: Clarendon Press. 1908 Translation.
- Smyth, H. 1984 *Greek Grammar*. Harvard: Harvard University Press.
- Tahko, T. 2018 Tahko, Tuomas E., "Fundamentality", *The Stanford Encyclopedia of Philosophy* (Fall 2018 Edition), Edward N. Zalta (ed.), URL = [<https://plato.stanford.edu/archives/fall2018/entries/fundamentality/>](https://plato.stanford.edu/archives/fall2018/entries/fundamentality/).
- Thomasson, A. 2007 'Artifacts and Human Concepts', in *Creations of the Mind. Theories of Artifacts and Their Representation*, E. Margolis and S. Laurence edd. Oxford: Oxford University Press, pp. 52–73.